DRINKING WATER SURVEILLANCE PROGRAM

OTTAWA (LEMIEUX ISLAND) WATER SUPPLY SYSTEM

ANNUAL REPORT 1990

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EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

OTTAWA WATER SUPPLY SYSTEM (LEMIEUX ISLAND) 1990 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1990, 76 systems were being monitored.

The Ottawa (Lemieux Island) water treatment plant is a conventional treatment plant which treats water from the Ottawa River. The process consists of coagulation, flocculation, sedimentation, filtration, post pH adjustment, fluoridation and disinfection. This plant has a rated capacity of 298.7 x 1000 m^3/day. The Ottawa (Lemieux Island) water treatment plant together with the Ottawa (Britannia) water treatment plant serves a population of approximately 523,800.

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), and organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons, specific pesticides and volatiles). Samples were analyzed for specific pesticides and chlorophenols twice a year in the spring and fall.

Table A is a summary of all results by group.

No known health related guidelines were exceeded.

The Ottawa (Lemieux Island) water treatment plant, for the sample year 1990, produced good quality water and this was maintained in the distribution system.

TABLE A

DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND)

SUMMARY TABLE BY SCAN

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

SCAN	SITE RAW TESTS	RAW POSITIVE	RAW %POSITIVE	TREATED TESTS	TREATED POSITIVE	TREATED %POSITIVE	SITE 1 TESTS	SITE 1 POSITIVE	SITE 1 %POSITIVE	SITE 2 TESTS	SITE 2 POSITIVE	SITE 2 %POSITIVE
BACTERIOLOGICAL	15	14	93	5	0	0	5	3	60	6	5	83
CHEMISTRY (FLD)	12	12	100	24	24	100	48	44	91	48	43	89
CHEMISTRY (LAB)	126	107	84	126	101	80	180	164	91	200	183	91
METALS	143	56	39	143	40	27	230	91	39	276	98	35
CHLOROAROMATICS	84	0	0	84	0	0	70	0	0	70	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	85	0	0	102	0	0	17	0	0	17	0	0
PESTICIDES & PCB	192	0	0	192	1	0	107	1	0	106	0	0
PHENOLICS	6	1	16	6	2	33	.	.	.	.	.	.
SPECIFIC PESTICIDES	55	0	0	55	0	0	5	0	0	5	0	0
VOLATILES	174	0	0	174	18	10	145	15	10	174	18	10
TOTAL	904	190		923	186		807	318		902	347	

DRINKING WATER SURVEILLANCE PROGRAM

OTTAWA WATER SUPPLY SYSTEM (LEMIEUX ISLAND)
1990 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1990, 76 systems were being monitored.

Appendix A has a full description of the DWSP.

The DWSP was initiated for the Ottawa (Lemieux Island) water treatment plant in the fall of 1986. Previous annual reports have been published for 1986, 1987, 1988 and 1989.

PLANT DESCRIPTION

The Ottawa (Lemieux Island) water treatment plant is a conventional treatment plant which treats water from the Ottawa River. The process consists of coagulation, flocculation, sedimentation, filtration, post pH adjustment, fluoridation and disinfection. This plant has a rated capacity of 298.7 x 1000 m^3/day. The Ottawa (Lemieux Island) water treatment plant together with the Ottawa (Britannia) water treatment plant serves a population of approximately 523,800.

The sample day flows ranged from 114.0 x 1000 m^3/day to 204.8 x 1000 m^3/day.

General plant information is presented in Table 1 and a schematic of plant processes, chemical addition points and sampling locations in Figure 1.

SAMPLING AND ANALYSES

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

At all distribution system locations two types of samples were obtained, a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples were used to

make an assessment of the change in the levels of inorganic compounds and metals, due to leaching from, or deposition on, the plumbing system. The only analyses carried out on the standing samples therefore, were General Chemistry and Metals. The free flow sample represented fresh water from the distribution main, since the sample tap was flushed for five minutes prior to sampling.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. Retention time was calculated by dividing the volume of water between two sampling points by sample day flow. For example, if it was determined that retention time within the plant was five hours, then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

Stringent DWSP sampling protocols were followed to ensure that all samples were taken in a uniform manner (see Appendix B).

Plant operating personnel routinely analyze parameters for process control (Table 2).

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals); and organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons, specific pesticides and volatiles). Samples were analyzed for specific pesticides and chlorophenols twice a year in the spring and fall. Laboratory analyses were conducted at the Ministry of the Environment facilities in Rexdale, Ontario.

RESULTS

Field measurements were recorded on the day of sampling and were entered onto the DWSP database as submitted by plant personnel.

Table 3 contains information on delay time between raw and treated water sampling, flow rate, and treatment chemical dosages.

Table 4 is a summary break-down of the number of water samples analyzed by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the

method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analyzed in the DWSP.

Associated guidelines and detection limits are also supplied on Tables 5 and 6. Parameters are listed alphabetically within each scan.

DISCUSSION

GENERAL

Water quality was judged by comparison with the Ontario Drinking Water Objectives publication (ODWOs). When an Ontario Drinking Water Objective (ODWO) was not available, guidelines/limits from other agencies were used. These guidelines were obtained from the Parameter Listing System database.

IN THIS REPORT, DISCUSSION IS LIMITED TO:

- **THE TREATED AND DISTRIBUTED WATER;**
- **ONLY THOSE PARAMETERS WITH CONCENTRATIONS ABOVE GUIDELINE VALUES; AND**
- **POSITIVE ORGANIC PARAMETERS DETECTED.**

BACTERIOLOGICAL

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality. Routine monitoring programs usually require that multiple samples be collected in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples.

Standard plate count was the only bacteriological analysis conducted on the treated and distributed water. No results were reported above the guideline.

INORGANIC & PHYSICAL

CHEMISTRY (FIELD)

It is desirable that the temperature of drinking water be less than 15°C. The palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and

corrosion problems. The temperature of the delivered water may increase in the distribution system due to the warming effect of the soil in late summer and fall and/or as a result of higher temperatures in the source water.

Field temperature exceeded the ODWO Maximum Desirable Concentration of 15°C in 3 of 12 treated and distributed water samples with a maximum reported value of 25.0°C.

CHEMISTRY (LAB)

Alkalinity was below the ODWO Aesthetic or Recommended Operational Guideline of 30-500 mg/L in 13 of 16 treated and distributed water samples with a minimum reported value of 22.2 mg/L.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important potential health effect of turbidity is its interference with disinfection in the treatment plant and the maintenance of a chlorine residual. The ODWO Maximum Acceptable Concentration for turbidity is 1.0 Formazin Turbidity Units (FTU).

The laboratory turbidity exceeded the Maximum Acceptable Concentration in 1 treated water sample with a reported value of 1.2 FTU but, this result was not confirmed by the corresponding field turbidity, a more reliable test.

METALS

At present, there is no evidence that aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of aluminum in treated water is important to indicate the efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 100 ug/L as aluminum in the water leaving the plant, to avoid problems in the distribution system.

Aluminum exceeded the ODWO Aesthetic or Recommended Operational Guideline of 100 ug/L in 8 of 17 treated and distributed water samples with a maximum reported value of 190.0 ug/L.

ORGANIC

CHLOROAROMATICS

Hexachlorocyclopentadiene was detected at positive levels in 2 of 5 treated and distributed water samples with a maximum reported value of 210.0 ng/L. The United States Environmental Protection Agency has an Ambient Water Quality Criteria of 206,000 ng/L.

The results of the other parameters in the chloroaromatic scan showed that none were detected above trace levels.

CHLOROPHENOLS

The results of the chlorophenol scan showed that none were detected.

POLYAROMATIC HYDROCARBONS (PAH)

The results of the PAH scan showed that one parameter was detected at a trace level in one of two distribution system samples.

PESTICIDES & PCB

The results of the PCB scan showed that none were detected.

The results of the regular pesticide scan showed that none were detected above trace levels.

PHENOLICS

Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes. The ODWOs recommend, as an operational guideline, that phenolic substances in drinking water not exceed 2.0 ug/L. This limit has been set primarily to prevent undesirable taste and odours, particularly in chlorinated water. No results exceeded the guideline.

SPECIFIC PESTICIDES

The results of the specific pesticides scan showed that none were detected.

VOLATILES

The detection of benzene, ethylbenzene, toluene and xylenes at low, trace levels may be a laboratory artifact derived from the analytical methodology.

Trihalomethanes (THMs) are produced during the water treatment process and will always occur in chlorinated waters. THMs are comprised of chloroform, chlorodibromomethane and dichlorobromomethane; bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs. Only total THMs results are discussed.

Total THMs were found at positive levels in the 17 treated and distributed water samples analyzed with a maximum level of 183.4 ug/L. This was below the ODWO Maximum Acceptable Concentration of 350 ug/L.

CONCLUSIONS

The Ottawa (Lemieux Island) water treatment plant, for the sample year 1990, produced good quality water and this was maintained in the distribution system.

No known health related guidelines were exceeded.

FIGURE 1

OTTAWA (LEMIEUX ISLAND) WATER TREATMENT PLANT

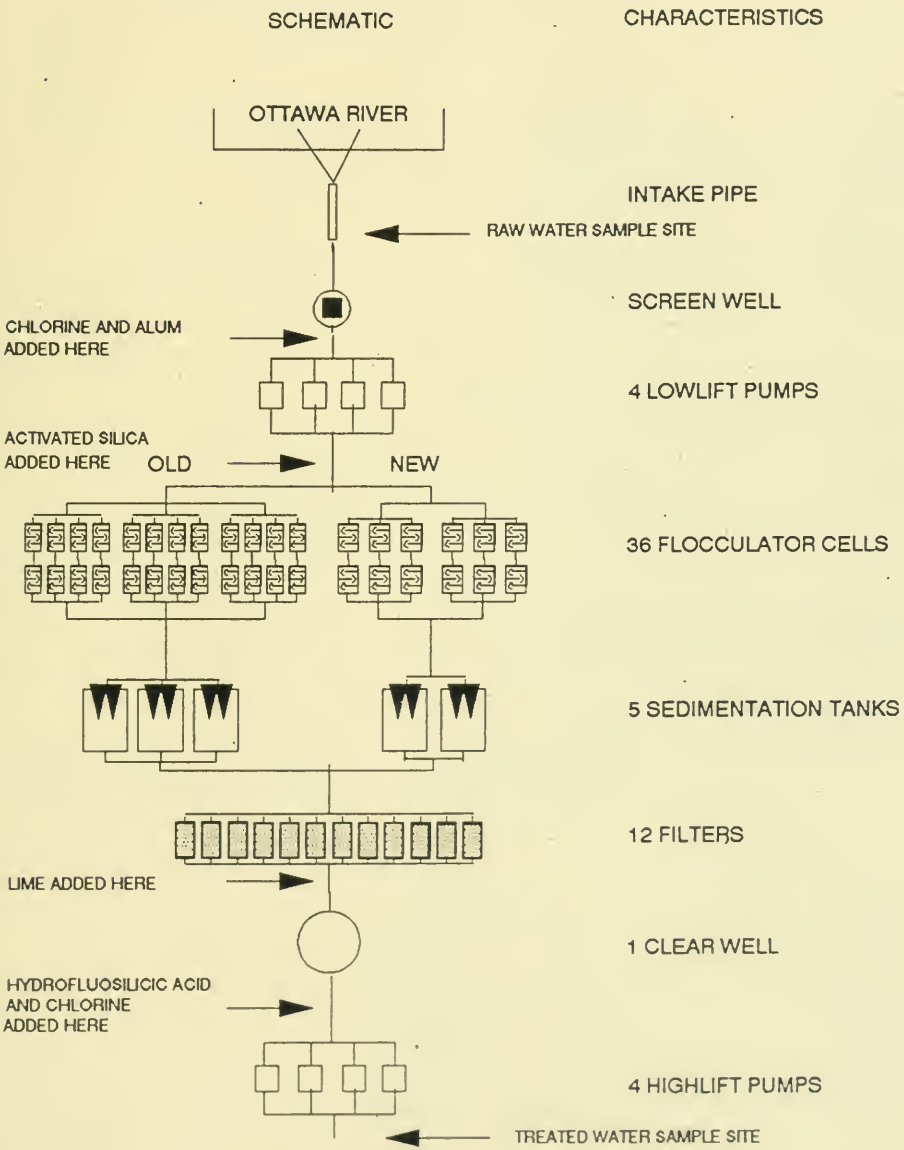

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM

PLANT GENERAL REPORT

WORKS #: 220003207
PLANT NAME: OTTAWA WSS (LEMIEUX ISLAND)

DISTRICT: OTTAWA
REGION: SOUTHEAST
DISTRICT OFFICER : R. DUNN

UTM #: 184428005029420

PLANT SUPERINTENDENT: LES SCHARFE

ADDRESS: BAYVIEW ROAD, LEMIEUX ISLAND
OTTAWA, ONTARIO

(613 728 3771)

MUNICIPALITY: OTTAWA CARLTON
AUTHORITY: MUNICIPAL

PLANT INFORMATION

PLANT VOLUME:	72.370	(X 1000 M3)
DESIGN CAPACITY:	298.700	(X 1000 M3/DAY)
RATED CAPACITY:	298.700	(X 1000 M3/DAY)

MUNICIPALITY	POPULATION
CUMBERLAND	17,008
GLOUCESTER	76,589
GOULBURN	9,720
NEPEAN	85,737
OSGOODE	9,561
OTTAWA	304,000
ROCKCLIFFE	2,267
VANIER	18,877

TABLE 2
DRINKING WATER SURVEILLANCE PROGRAM
IN-PLANT MONITORING

PARAMETER	LOCATION	FREQUENCY
ALUMINUM	TREATED WATER IN LAB	WEEKLY
COMBINED CHLORINE RESIDUAL	TREATED WATER IN LAB	DAILY READING
	SETTLED WATER IN LAB	DAILY READING
	FILTERED WATER IN LAB	DAILY READING
	MIXED WATER IN LAB	DAILY READING
	AFTER MIXERS	HOURLY READING
	TREATED WATER	CONTINUOUS
TOTAL CHLORINE RESIDUAL	TREATED WATER IN LAB	DAILY READING
	FILTERED WATER IN LAB	DAILY READING
FLUORIDE	TREATED WATER IN LAB	DAILY READING
	TREATED WATER	CONTINUOUS
PH	TREATED WATER IN LAB	DAILY READING
	AFTER DISINFECTION	CONTINUOUS
	FILTERED WATER IN LAB	DAILY READING
	MIXED WATER IN LAB	CONTINUOUS
	RAW WATER IN LAB	DAILY READING
	TREATED WATER	CONTINUOUS
SILICA	RAW WATER	WKLY
	TREATED WATER	WKLY
TURBIDITY	TREATED WATER IN LAB	DAILY READING
	SETTLED WATER IN LAB	DAILY READING
	FILTERED WATER IN LAB	DAILY READING
	AFTER FILTERS	EVERY 1/2 HOUR
	RAW WATER	DAILY READING
	AFTER SETTLING TANKS	CONTINUOUS
	TREATED WATER	CONTINUOUS

TABLE 3
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) SAMPLE DAY CONDITIONS FO 1990

TREATMENT CHEMICAL DOSAGE (MG/L)

			PRE CHLORINATION	COAGULATION	ACTIVATION	COAGULATION AID	POST PH ADJUSTMENT		FLUORIDATION	POST CHLORINATION
DATE	DELAY * TIME(HRS)	FLOW (1000M3)	CHLORINE	ALUM LIQUID	ALUM LIQUID	SODIUM SILICATE	CALCIUM CARBONATE	SODIUM HYDROXIDE	HYDROFLUOSILICIC ACID	CHLORINE
FEB 28	4.60	204.810	1.00	30.00	4.00	2.00	14.00		.90	1.20
APR 25	4.90	193.558	1.00	34.00	3.00	1.50	14.00		.90	1.00
AUG 29	4.25	197.190	2.80	26.00	2.00	1.00	14.00		1.00	1.50
DEC 18	5.00	114.000	1.60	28.00			16.00		1.00	1.30

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND)
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 2		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
BACTERIOLOGICAL												
FECAL COLIFORM MF	5	5	0	.	.	.	.	.	.	.	.	.
STANDRD PLATE CNT MF	.	.	.	5	0	0	5	3	0	6	5	0
TOTAL COLIFORM MF	5	4	0	.	.	.	.	.	.	.	.	.
T COLIFORM BCKGRD MF	5	5	0	.	.	.	.	.	.	.	.	.
*TOTAL GROUP BACTERIOLOGICAL	15	14	0	5	0	0	5	3	0	6	5	0
CHEMISTRY (FLD)												
FLD CHLORINE (COMB)	.	.	.	4	4	0	8	7	0	8	7	0
FLD CHLORINE FREE	.	.	.	4	4	0	8	6	0	8	5	0
FLD CHLORINE (TOTAL)	.	.	.	4	4	0	8	7	0	8	7	0
FLD PH	4	4	0	4	4	0	8	8	0	8	8	0
FLD TEMPERATURE	4	4	0	4	4	0	8	8	0	8	8	0
FLD TURBIDITY	4	4	0	4	4	0	8	8	0	8	8	0
*TOTAL SCAN CHEMISTRY (FLD)	12	12	0	24	24	0	48	44	0	48	43	0
CHEMISTRY (LAB)												
ALKALINITY	6	6	0	6	6	0	10	10	0	11	11	0
CALCIUM	6	6	0	6	6	0	10	10	0	11	11	0
CYANIDE	6	0	0	6	0	0	.	.	.	.	.	.
CHLORIDE	6	5	1	6	6	0	10	10	0	11	11	0
COLOUR	6	6	0	6	5	1	10	9	1	11	11	0
CONDUCTIVITY	6	6	0	6	6	0	10	10	0	11	11	0
DISS ORG CARBON	6	6	0	6	6	0	10	10	0	12	12	0
FLUORIDE	6	2	4	6	6	0	10	10	0	11	11	0
HARDNESS	6	6	0	6	6	0	10	10	0	11	11	0
IONCAL	6	6	0	6	6	0	10	10	0	12	11	0
LANGELIERS INDEX	0	0	0	0	0	0	0	0	0	0	0	0
MAGNESIUM	6	6	0	6	6	0	10	10	0	11	11	0
SODIUM	6	6	0	6	6	0	10	10	0	11	11	0
AMMONIUM TOTAL	6	4	0	6	0	2	10	5	2	11	6	1
NITRITE	6	4	2	6	1	3	10	0	7	11	2	7
TOTAL NITRATES	6	6	0	6	6	0	10	10	0	11	11	0
NITROGEN TOT KJELD	6	6	0	6	6	0	10	10	0	11	11	0
PH	6	6	0	6	6	0	10	10	0	11	11	0
PHOSPHORUS FIL REACT	6	4	2	6	3	3	.	.	.	.	.	.
PHOSPHORUS TOTAL	6	4	2	6	3	3	.	.	.	.	.	.
SULPHATE	6	6	0	6	6	0	10	10	0	11	11	0
TURBIDITY	6	6	0	6	5	1	10	10	0	11	9	2
*TOTAL SCAN CHEMISTRY (LAB)	126	107	11	126	101	13	180	164	10	200	183	10

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND)
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 2		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
METALS												
SILVER	6	0	0	6	0	0	10	0	0	12	0	0
ALUMINUM	6	6	0	6	6	0	10	10	0	12	12	0
ARSENIC	6	2	4	6	0	6	10	0	10	12	0	12
BARIUM	6	6	0	6	6	0	10	10	0	12	12	0
BORON	6	0	6	6	0	6	10	1	9	12	0	12
BERYLLIUM	6	0	1	6	0	0	10	0	0	12	0	0
CADMIUM	6	0	0	6	0	0	10	0	1	12	0	1
COBALT	6	0	6	6	0	6	10	0	10	12	0	12
CHROMIUM	6	0	5	6	0	3	10	0	9	12	0	6
COPPER	6	6	0	6	0	6	10	6	4	12	6	6
IRON	6	6	0	6	0	4	10	1	7	12	0	10
MERCURY	5	0	2	5	0	1	.	.	.	.	.	.
MANGANESE	6	6	0	6	6	0	10	10	0	12	12	0
MOLYBDENUM	6	1	5	6	0	6	10	0	10	12	0	12
NICKEL	6	0	6	6	0	2	10	0	5	12	0	6
LEAD	6	0	6	6	0	0	10	10	0	12	6	6
ANTIMONY	6	2	4	6	0	6	10	8	2	12	7	5
SELENIUM	6	0	0	6	0	0	10	0	0	12	0	0
STRONTIUM	6	6	0	6	6	0	10	10	0	12	12	0
TITANIUM	6	6	0	6	4	2	10	6	4	12	7	5
THALLIUM	6	0	0	6	0	0	10	0	0	12	0	0
URANIUM	6	0	5	6	0	0	10	0	0	12	0	0
VANADIUM	6	3	3	6	6	0	10	10	0	12	12	0
ZINC	6	6	0	6	6	0	10	9	1	12	12	0
*TOTAL SCAN METALS	143	56	53	143	40	48	230	91	72	276	98	93
*TOTAL GROUP INORGANIC & PHYSICAL	281	175	64	293	165	61	458	299	82	524	324	103
CHLOROAROMATICS												
HEXACHLOROBUTADIENE	6	0	0	6	0	0	5	0	0	5	0	0
123 TRICHLOROBENZENE	6	0	0	6	0	0	5	0	0	5	0	0
1234 T-CHLOROBENZENE	6	0	0	6	0	0	5	0	0	5	0	0
1235 T-CHLOROBENZENE	6	0	0	6	0	0	5	0	0	5	0	0
124 TRICHLOROBENZENE	6	0	0	6	0	0	5	0	0	5	0	0
1245 T-CHLOROBENZENE	6	0	0	6	0	0	5	0	0	5	0	0
135 TRICHLOROBENZENE	6	0	0	6	0	0	5	0	0	5	0	0
HCB	6	0	0	6	0	0	5	0	0	5	0	0
HEXACHLOROETHANE	6	0	0	6	0	1	5	0	1	5	0	0
OCTACHLOROSTYRENE	6	0	0	6	0	0	5	0	0	5	0	0
PENTACHLOROBENZENE	6	0	0	6	0	0	5	0	0	5	0	0
236 TRICHLOROTOLUENE	6	0	0	6	0	0	5	0	0	5	0	0
245 TRICHLOROTOLUENE	6	0	0	6	0	0	5	0	0	5	0	0
26A TRICHLOROTOLUENE	6	0	0	6	0	0	5	0	0	5	0	0
*TOTAL SCAN CHLOROAROMATICS	84	0	0	84	0	1	70	0	1	70	0	0
CHLOROPHENOLS												

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND)
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 2		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
234 TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
2345 T-CHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
2356 T-CHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
245-TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
246-TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
PENTACHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
*TOTAL SCAN CHLOROPHENOLS	12	0	0	12	0	0	0	0	0	0	0	0
PAH												
PHENANTHRENE	5	0	0	6	0	0	1	0	1	1	0	0
ANTHRACENE	5	0	0	6	0	0	1	0	0	1	0	0
FLUORANTHENE	5	0	0	6	0	0	1	0	0	1	0	0
PYRENE	5	0	0	6	0	0	1	0	0	1	0	0
BENZO(A)ANTHRACENE	5	0	0	6	0	0	1	0	0	1	0	0
CHRYSENE	5	0	0	6	0	0	1	0	0	1	0	0
DIMETH. BENZ(A)ANTHR	5	0	0	6	0	0	1	0	0	1	0	0
BENZO(E) PYRENE	5	0	0	6	0	0	1	0	0	1	0	0
BENZO(B) FLUORANTHEN	5	0	0	6	0	0	1	0	0	1	0	0
PERYLENE	5	0	0	6	0	0	1	0	0	1	0	0
BENZO(K) FLUORANTHEN	5	0	0	6	0	0	1	0	0	1	0	0
BENZO(A) PYRENE	5	0	0	6	0	0	1	0	0	1	0	0
BENZO(G,H,I) PERYLEN	5	0	0	6	0	0	1	0	0	1	0	0
DIBENZO(A,H) ANTHRAC	5	0	0	6	0	0	1	0	0	1	0	0
INDENO(1,2,3-C,D) PY	5	0	0	6	0	0	1	0	0	1	0	0
BENZO(B) CHRYSENE	5	0	0	6	0	0	1	0	0	1	0	0
CORONENE	5	0	0	6	0	0	1	0	0	1	0	0
*TOTAL SCAN PAH	85	0	0	102	0	0	17	0	1	17	0	0
PESTICIDES & PCB												
ALDRIN	6	0	0	6	0	0	5	0	0	5	0	0
ALPHA BHC	6	0	0	6	0	2	5	0	1	5	0	1
BETA BHC	6	0	0	6	0	0	5	0	0	5	0	0
LINDANE	6	0	0	6	0	0	5	0	0	5	0	0
ALPHA CHLORDANE	6	0	0	6	0	0	5	0	0	5	0	0
GAMMA CHLORDANE	6	0	0	6	0	0	5	0	0	5	0	0
DIELDRIN	6	0	0	6	0	0	5	0	0	5	0	0
METHOXYCHLOR	6	0	0	6	0	0	5	0	0	5	0	0
ENDOSULFAN 1	6	0	0	6	0	0	5	0	0	5	0	0
ENDOSULFAN II	6	0	0	6	0	0	5	0	0	5	0	0
ENDRIN	6	0	0	6	0	0	5	0	0	5	0	0
ENDOSULFAN SULPHATE	6	0	0	6	0	0	5	0	0	5	0	0
HEPTACHLOR EPOXIDE	6	0	0	6	0	0	5	0	0	5	0	0
HEPTACHLOR	6	0	0	6	0	0	5	0	0	5	0	0
MIREX	6	0	0	6	0	0	5	0	0	5	0	0
OXYCHLORDANE	6	0	0	6	0	0	5	0	0	5	0	0
OPDDT	6	0	0	6	0	0	5	0	0	5	0	0
PCB	6	0	0	6	0	0	5	0	0	5	0	0
DDD	6	0	0	6	0	0	5	0	0	5	0	0
PPDDE	6	0	0	6	0	0	5	0	0	5	0	0

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND)
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 2		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PPDDT	6	0	0	6	0	0	5	0	0	5	0	0
AMETRINE	5	0	0	5	0	0	.	.	.	.	.	.
ATRAZINE	5	0	0	5	0	0	.	.	.	.	.	.
ATRATONE	5	0	0	5	0	0	.	.	.	.	.	.
CYANAZINE (BLADEX)	5	0	0	5	0	0	.	.	.	.	.	.
DESETHYLATRAZINE	5	0	0	5	0	0	.	.	.	.	.	.
D-ETHYL SIMAZINE	4	0	0	4	0	0	.	.	.	.	.	.
PROMETONE	5	0	0	5	0	0	.	.	.	.	.	.
PROPAZINE	5	0	0	5	0	0	.	.	.	.	.	.
PROMETRYNE	5	0	0	5	0	0	.	.	.	.	.	.
METRIBUZIN (SENCOR)	5	0	0	5	0	0	.	.	.	.	.	.
SIMAZINE	5	0	0	5	0	0	.	.	.	.	.	.
ALACHLOR (LASSO)	5	0	0	5	0	0	.	.	.	.	.	.
METOLACHLOR	5	0	0	5	0	0	.	.	.	.	.	.
HEXACLCYCLOPENTADIEN	2	0	0	2	1	0	2	1	0	1	0	0
*TOTAL SCAN PESTICIDES & PCB	192	0	0	192	1	2	107	1	1	106	0	1
PHENOLICS												
PHENOLICS	6	1	4	6	2	2	.	.	.	.	.	.
*TOTAL SCAN PHENOLICS	6	1	4	6	2	2	0	0	0	0	0	0
SPECIFIC PESTICIDES												
TOXAPHENE	6	0	0	6	0	0	5	0	0	5	0	0
2,4,5-T	2	0	0	2	0	0	.	.	.	.	.	.
2,4-D	1	0	0	1	0	0	.	.	.	.	.	.
2,4-DB	2	0	0	2	0	0	.	.	.	.	.	.
2,4 D PROPIONIC ACID	2	0	0	2	0	0	.	.	.	.	.	.
DICAMBA	1	0	0	1	0	0	.	.	.	.	.	.
PICHLORAM	0	0	0	0	0	0	.	.	.	.	.	.
SILVEX	2	0	0	2	0	0	.	.	.	.	.	.
DIAZINON	2	0	0	2	0	0	.	.	.	.	.	.
DICHLOROVOS	2	0	0	2	0	0	.	.	.	.	.	.
CHLORPYRIFOS	2	0	0	2	0	0	.	.	.	.	.	.
ETHION	2	0	0	2	0	0	.	.	.	.	.	.
AZINPHOS-METHYL	0	0	0	0	0	0	.	.	.	.	.	.
MALATHION	2	0	0	2	0	0	.	.	.	.	.	.
MEVINPHOS	2	0	0	2	0	0	.	.	.	.	.	.
METHYL PARATHION	2	0	0	2	0	0	.	.	.	.	.	.
METHYLTRITHION	2	0	0	2	0	0	.	.	.	.	.	.
PARATHION	2	0	0	2	0	0	.	.	.	.	.	.
PHORATE	1	0	0	1	0	0	.	.	.	.	.	.
RELDAN	2	0	0	2	0	0	.	.	.	.	.	.
RONNEL	2	0	0	2	0	0	.	.	.	.	.	.
AMINOCARB	0	0	0	0	0	0	.	.	.	.	.	.
BENONYL	0	0	0	0	0	0	.	.	.	.	.	.
BUX	0	0	0	0	0	0	.	.	.	.	.	.
CARBOFURAN	2	0	0	2	0	0	.	.	.	.	.	.
CICP	2	0	0	2	0	0	.	.	.	.	.	.
DIALLATE	2	0	0	2	0	0	.	.	.	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND)
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 2		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
EPTAM	2	0	0	2	0	0	.	.	.	.	.	.
IPC	2	0	0	2	0	0	.	.	.	.	.	.
PROPOXUR	2	0	0	2	0	0	.	.	.	.	.	.
CARBARYL	2	0	0	2	0	0	.	.	.	.	.	.
BUTYLATE	2	0	0	2	0	0	.	.	.	.	.	.
*TOTAL SCAN SPECIFIC PESTICIDES	55	0	0	55	0	0	5	0	0	5	0	0
VOLATILES												
BENZENE	6	0	1	6	0	2	5	0	3	6	0	2
TOLUENE	6	0	0	6	0	0	5	0	0	6	0	0
ETHYLBENZENE	6	0	3	6	0	4	5	0	4	6	0	4
P-XYLENE	6	0	0	6	0	0	5	0	0	6	0	0
M-XYLENE	6	0	0	6	0	0	5	0	0	6	0	0
O-XYLENE	6	0	0	6	0	0	5	0	0	6	0	0
STYRENE	6	0	3	6	0	5	5	0	5	6	0	6
1,1 DICHLOROETHYLENE	6	0	0	6	0	0	5	0	0	6	0	0
METHYLENE CHLORIDE	6	0	0	6	0	0	5	0	0	6	0	0
T1,2DICHLOROETHYLENE	6	0	0	6	0	0	5	0	0	6	0	0
1,1 DICHLOROETHANE	6	0	0	6	0	0	5	0	0	6	0	0
CHLOROFORM	6	0	3	6	6	0	5	5	0	6	6	0
111, TRICHLOROETHANE	6	0	1	6	0	0	5	0	0	6	0	0
1,2 DICHLOROETHANE	6	0	0	6	0	0	5	0	0	6	0	0
CARBON TETRACHLORIDE	6	0	0	6	0	0	5	0	0	6	0	0
1,2 DICHLOROPROPANE	6	0	0	6	0	0	5	0	0	6	0	0
TRICHLOROETHYLENE	6	0	0	6	0	0	5	0	0	6	0	0
DICHLOROBROMOMETHANE	6	0	0	6	6	0	5	5	0	6	6	0
112 TRICHLOROETHANE	6	0	0	6	0	0	5	0	0	6	0	0
CHLORODIBROMOMETHANE	6	0	0	6	0	0	5	0	0	6	0	0
T-CHLORDETHYLENE	6	0	0	6	0	0	5	0	0	6	0	1
BROMOFORM	6	0	0	6	0	0	5	0	0	6	0	0
1122 T-CHLOROETHANE	6	0	0	6	0	0	5	0	0	6	0	0
CHLOROBENZENE	6	0	0	6	0	0	5	0	0	6	0	0
1,4 DICHLOROBENZENE	6	0	0	6	0	0	5	0	0	6	0	0
1,3 DICHLOROBENZENE	6	0	0	6	0	0	5	0	0	6	0	0
1,2 DICHLOROBENZENE	6	0	0	6	0	0	5	0	0	6	0	0
ETHLYENE DIBROMIDE	6	0	0	6	0	0	5	0	0	6	0	0
TOTL TRIHALOMETHANES	6	0	1	6	6	0	5	5	0	6	6	0
*TOTAL SCAN VOLATILES	174	0	12	174	18	11	145	15	12	174	18	13
*TOTAL GROUP ORGANIC	608	1	16	625	21	16	344	16	15	372	18	14

KEY TO TABLE 5 and 6

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
2. Interim Maximum Acceptable Concentration (IMAC)
3. Aesthetic Objective (AO)
3*. AO for Total Xylenes
4. Recommended Operational Guideline

B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO)

C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria
4T. EPA Ambient Water Quality Criteria for Total PAH

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurement Amount
<T	Greater Than Detection Limit But Not Confident (SEE INTERPRETATION OF RESULTS ABOVE)
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!IV	No Data: Inverted Septum
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!QU	No Data: Quality Control Unacceptable
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RE	No Data: Received Empty
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
!TX	No Data: Time Expired
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample
RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant

UCR		Unreliable: Could Not Confirm By Reanalysis
UCS		Unreliable: Contamination Suspected
UIN		Unreliable: Indeterminate Interference
XP		Positive After X Number Of Hours
T#	(T06)	Result Taken After # Hours

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
BACTERIOLOGICAL						
FECAL COLIFORM MF (CT/100ML)		**DET'N LIMIT = 0**		**GUIDELINE = 0 (A1)**		
FEB	14	.	.	.	.	.
APR	58	.	.	.	.	.
JUN	32	.	.	.	.	.
OCT	102	.	.	.	.	.
DEC	8	.	.	.	.	.
STANDRD PLATE CNT MF (count/ml)		**DET'N LIMIT = 0**		**GUIDELINE = 500/ML (A3)**		
FEB	.	0 <=>	.	0 <=>	.	12
APR	.	9 <=>	.	18	.	20
JUN	.	2 <=>	.	.	.	10
AUG	.	.	.	114	.	22
OCT	.	4 <=>	.	16	.	7 <=>
DEC	.	1 <=>	.	2 <=>	.	11
TOTAL COLIFORM MF (CT/100ML)		**DET'N LIMIT = 0**		**GUIDELINE = 5/100ML(A1)**		
FEB	148	.	.	.	.	.
APR	280	.	.	.	.	.
JUN	200	.	.	.	.	.
OCT	320	.	.	.	.	.
DEC	60 <=>	.	.	.	.	.
T COLIFORM BCKGRD MF (CT/100ML)		**DET'N LIMIT = 0**		**GUIDELINE = N/A**		
FEB	4000	.	.	.	.	.
APR	1700	.	.	.	.	.
JUN	11000	.	.	.	.	.
OCT	4600	.	.	.	.	.
DEC	1300	.	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (FLD)						
FLD CHLORINE (COMB) (MG/L)			DET'N LIMIT = 0	GUIDELINE = N/A		
FEB	.	.200	.200	.050	.050	.100
APR	.	.200	.000	.250	.000	.040
AUG	.	.100	.150	.150	.050	.100
DEC	.	.100	.050	.100	.050	.100
FLD CHLORINE FREE (MG/L)			DET'N LIMIT = 0	GUIDELINE = N/A		
FEB	.	1.000	.050	.000	.000	.050
APR	.	.800	.000	.200	.000	.010
AUG	.	1.400	.100	.200	.000	.050
DEC	.	1.200	.100	.650	.050	.300
FLD CHLORINE (TOTAL) (MG/L)			DET'N LIMIT = 0	GUIDELINE = N/A		
FEB	.	1.200	.250	.050	.050	.150
APR	.	1.000	.000	.450	.000	.050
AUG	.	1.500	.250	.350	.050	.150
DEC	.	1.300	.150	.750	.100	.400
FLD PH (DMNSLESS)			DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5(A4)		
FEB	6.900	7.300	7.500	7.500	7.700	7.700
APR	6.900	8.400	7.500	7.800	7.300	7.700
AUG	7.300	7.500	7.400	7.400	7.600	7.900
DEC	7.100	8.500	7.500	8.000	7.700	8.000
FLD TEMPERATURE (DEG.C)			DET'N LIMIT = N/A	GUIDELINE = 15 (A3)		
FEB	2.500	2.500	23.000	2.500	13.000	4.000
APR	5.500	6.000	22.000	6.500	17.000	5.500
AUG	25.000	25.000	24.000	23.000	22.000	19.000
DEC	3.800	3.500	23.000	4.000	16.000	8.000
FLD TURBIDITY (FTU)			DET'N LIMIT = N/A	GUIDELINE = 1 (A1)		
FEB	3.000	.520	.370	.510	.280	.200
APR	5.000	.410	.150	.260	.110	.280
AUG	.800	.320	.410	.270	.530	.410
DEC	3.900	.040	.090	.070	.160	.210

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (LAB)						
ALKALINITY (MG/L)			DET'N LIMIT = 0.2	GUIDELINE = 30-500 (A3)		
FEB	26.000	23.200	30.800	29.900	31.600	!!S
APR	30.100	32.600	32.200	32.200	33.200	31.900
JUN	18.900	23.400	.	.	24.300	23.600
AUG	20.400	22.700	23.200	22.600	24.300	26.800
OCT	24.200	25.200	26.700	26.900	25.600	27.100
DEC	22.900	25.300	26.000	26.800	26.300	27.200
CALCIUM (MG/L)			DET'N LIMIT = 0.2	GUIDELINE = 100 (F2)		
FEB	10.000	16.800	19.400	20.200	19.800	!!S
APR	12.200	21.600	21.200	21.400	21.600	21.800
JUN	8.200	18.200	.	.	18.800	18.200
AUG	7.700	17.400	17.800	17.300	18.500	17.800
OCT	9.800	18.000	18.800	18.600	18.200	18.900
DEC	9.600	9.800	10.600	9.400	16.400	17.000
CHLORIDE (MG/L)			DET'N LIMIT = 0.2	GUIDELINE = 250 (A3)		
FEB	3.600	5.400	5.400	5.300	5.400	!!S
APR	2.600	4.600	5.000	4.800	5.100	5.200
JUN	.200 <T	5.500	.	.	5.600	5.700
AUG	3.000	6.400	6.500	6.400	6.300	6.300
OCT	3.200	6.000	6.100	6.200	6.000	6.000
DEC	2.600	4.200	4.300	4.300	4.500	4.400
COLOUR (HZU)			DET'N LIMIT = 0.5	GUIDELINE = 5 (A3)		
FEB	36.500	4.000	5.000	4.000	4.000	!!S
APR	36.000	3.500	3.500	3.000	3.500	3.500
JUN	30.500	3.000	.	.	3.000	3.000
AUG	29.500	3.000	4.000	4.000	4.000	4.000
OCT	32.000	2.500	4.000	4.500	3.500	4.000
DEC	36.500	2.000 <T	2.500	2.000 <T	3.000	2.500
CONDUCTIVITY (UMHO/CM)			DET'N LIMIT = 1.	GUIDELINE = 400 (F2)		
FEB	90	133	147	148	148	!!S
APR	94	151	151	149	154	153
JUN	67	124	.	.	125	124
AUG	74	127	129	128	131	135
OCT	88	139	142	142	141	143
DEC	79	132	133	136	137	137
DISS ORG CARBON (MG/L)			DET'N LIMIT = .100	GUIDELINE = 5.0 (A3)		
FEB	6.000	2.800	2.800	2.700	2.700	2.900
APR	5.900	2.600	2.700	2.600	2.400	2.500
JUN	5.700	2.700	.	.	2.600	2.600
AUG	6.000	3.200	3.200	3.100	3.400	3.100
OCT	6.000	3.200	3.000	3.100	2.900	2.800
DEC	6.500	2.600	2.600	2.600	3.400	2.700

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
FLUORIDE (MG/L)			DET'N LIMIT = 0.01	GUIDELINE = 2.4 (A1)		
FEB	.040 <T	.840	.860	.900	.920	!!S
APR	.040 <T	.880	.880	.880	.960	.960
JUN	.040 <T	.960	.	.	1.000	1.000
AUG	.040 <T	1.020	1.020	1.080	1.100	1.060
OCT	.060	.940	1.020	1.040	1.020	1.000
DEC	.060	.820	.840	.900	.860	.860
HARDNESS (MG/L)			DET'N LIMIT = 0.5	GUIDELINE = 80-100 (A4)		
FEB	35.000	52.000	59.000	61.000	59.000	!!S
APR	42.000	65.000	64.000	65.000	65.000	66.000
JUN	28.000	53.000	.	.	54.000	53.000
AUG	28.600	53.300	54.600	52.300	56.000	54.200
OCT	34.800	55.600	57.400	56.900	55.700	57.700
DEC	33.000	34.000	35.000	33.000	51.000	52.000
IONCAL (DMNSLESS)			DET'N LIMIT = N/A	GUIDELINE = N/A		
FEB	2.807	1.688	.574	2.477	2.864	.000
APR	8.426	5.609	3.696	5.567	3.317	5.774
JUN	17.430	7.875	.	.	9.621	6.362
AUG	2.780	8.169	9.661	7.429	11.580	4.232
OCT	.290	3.167	2.070	3.552	1.648	6.323
DEC	5.056	4.770	1.695	4.132	6.449	5.532
LANGELIERS INDEX (DMNSLESS)			DET'N LIMIT = N/A	GUIDELINE = N/A		
FEB	-1.388	-1.342	-.762	-.788	-.683	.
APR	-1.090	-.713	-.806	-.781	-.746	-.769
JUN	-1.582	-.899	.	.	-.949	-.975
AUG	-1.510	-1.103	-1.015	-1.088	-1.039	-.745
OCT	-1.427	-1.008	-.986	-.947	-1.048	-1.008
DEC	-1.406	-1.228	-1.222	-1.183	-1.009	-.789
MAGNESIUM (MG/L)			DET'N LIMIT = 0.1	GUIDELINE = 30 (F2)		
FEB	2.400	2.400	2.600	2.600	2.500	!!S
APR	2.800	2.700	2.600	2.700	2.800	2.700
JUN	1.800	1.900	.	.	1.800	1.800
AUG	2.250	2.350	2.450	2.200	2.350	2.400
OCT	2.500	2.550	2.550	2.550	2.500	2.550
DEC	2.300	2.300	2.200	2.300	2.500	2.500
SODIUM (MG/L)			DET'N LIMIT = 0.2	GUIDELINE = 200 (A4)		
FEB	2.800	2.800	3.000	3.400	2.800	!!S
APR	2.800	3.000	3.200	3.000	3.200	3.400
JUN	2.600	2.600	.	.	3.000	2.600
AUG	2.900	2.800	2.900	2.900	3.000	2.900
OCT	2.600	2.900	3.000	3.000	3.000	3.200
DEC	2.400	12.400	11.200	13.400	5.400	4.800

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
AMMONIUM TOTAL (MG/L)			DET'N LIMIT = 0.002	GUIDELINE = 0.05 (F2)		
FEB	.064	BDL	.134	.046	.034	!!S
APR	.022	BDL	.072	BDL	BDL	BDL
JUN	BDL	BDL	.	.	.050	.012
AUG	.044	.004 <T	.012	.018	.028	.026
OCT	BDL	.002 <T	.008 <T	.004 <T	.012	.004 <T
DEC	.016	BDL	BDL	BDL	BDL	BDL
NITRITE (MG/L)			DET'N LIMIT = 0.001	GUIDELINE = 1 (A1)		
FEB	.005	.001 <T	.002 <T	.001 <T	.002 <T	!!S
APR	.004 <T	BDL	BDL	BDL	BDL	BDL
JUN	.014	.008	.	.	.006	.014
AUG	.005	.003 <T	.002 <T	.002 <T	.003 <T	.002 <T
OCT	.004 <T	BDL	.001 <T	.001 <T	.001 <T	.001 <T
DEC	.008	.001 <T	.001 <T	BDL	.001 <T	.001 <T
TOTAL NITRATES (MG/L)			DET'N LIMIT = 0.005	GUIDELINE = 10 (A1)		
FEB	.255	.255	.395	.300	.275	!!S
APR	.220	.215	.350	.235	.250	.225
JUN	.170	.140	.	.	.260	.165
AUG	.165	.155	.320	.170	.270	.160
OCT	.270	.270	.275	.270	.280	.290
DEC	.210	.205	.215	.205	.225	.215
NITROGEN TOT KJELD (MG/L)			DET'N LIMIT = 0.02	GUIDELINE = N/A		
FEB	.390	.180	.350	.240	.210	!!S
APR	.290	.100	.230	.120	.130	.140
JUN	.370	.150	.	.	.210	.200
AUG	.280	.170	.160	.160	.230	.190
OCT	.350	.140	.160	.160	.160	.190
DEC	.350	.150	.150	.150	.210	.140
PH (DMNSLESS)			DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5(A4)		
FEB	7.550	7.440	7.840	7.810	7.900	!!S
APR	7.700	7.820	7.740	7.760	7.780	7.770
JUN	7.570	7.840	.	.	7.760	7.760
AUG	7.640	7.670	7.740	7.690	7.680	7.950
OCT	7.550	7.710	7.690	7.730	7.660	7.660
DEC	7.600	7.750	7.710	7.790	7.730	7.920
PHOSPHORUS FIL REACT (MG/L)			DET'N LIMIT = 0.0005	GUIDELINE = N/A		
FEB	.002	.003	.	.	.	.
APR	.002 <T	.000 <T	.	.	.	.
JUN	.001 <T	.000 <T	.	.	.	.
AUG	.003	.002	.	.	.	.
OCT	.003	.006	.	.	.	.
DEC	.002	.001 <T	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
PHOSPHORUS TOTAL (MG/L)			DET'N LIMIT = 0.002	GUIDELINE = .40 (F2)		
FEB	.010	.010	.	.	.	.
APR	.015	.013	.	.	.	.
JUN	.008 <T	.008 <T	.	.	.	.
AUG	.008 <T	.011	.	.	.	.
OCT	.012	.009 <T	.	.	.	.
DEC	.013	.004 <T	.	.	.	.
SULPHATE (MG/L)			DET'N LIMIT = .200	GUIDELINE = 500 (A3)		
FEB	9.910	26.070	25.600	27.420	26.490	IIS
APR	9.450	26.770	26.690	26.390	27.630	27.740
JUN	8.410	22.010	.	.	21.640	21.880
AUG	8.420	21.550	21.100	21.420	20.960	21.080
OCT	10.410	24.200	25.330	23.680	25.160	23.230
DEC	9.140	25.120	25.000	24.970	24.670	24.630
TURBIDITY (FTU)			DET'N LIMIT = 0.05	GUIDELINE = 1 (A1)		
FEB	3.800	1.200	.960	1.200	.970	IIS
APR	5.000	.410	.500	.570	.340	.270
JUN	1.400	.310	.	.	.240 <T	.210 <T
AUG	1.240	.330	.680	.500	.900	.890
OCT	3.400	.180 <T	.750	.320	1.400	.380
DEC	3.900	.840	.620	.530	.720	.910

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
METALS						
ALUMINUM (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = 100 (A4)		
FEB	130.000	160.000	130.000	130.000	110.000	110.000
APR	160.000	64.000	83.000	50.000	81.000	67.000
JUN	84.000	130.000	.	.	110.000	120.000
AUG	44.000	84.000	70.000	77.000	98.000	95.000
OCT	110.000	69.000	66.000	77.000	62.000	55.000
DEC	150.000	190.000	160.000	170.000	130.000	130.000
ARSENIC (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = 25 (A1)		
FEB	1.100	.330 <T	.400 <T	.390 <T	.320 <T	.430 <T
APR	.730 <T	.680 <T	.420 <T	.500 <T	.530 <T	.630 <T
JUN	.680 <T	.470 <T	.	.	.570 <T	.450 <T
AUG	.730 <T	.350 <T	.390 <T	.290 <T	.700 <T	.650 <T
OCT	1.100	.660 <T	.710 <T	.810 <T	.660 <T	.660 <T
DEC	1.000 <T	.460 <T	.530 <T	.500 <T	.490 <T	.480 <T
BARIUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 1000 (A2)		
FEB	18.000	19.000	20.000	17.000	17.000	16.000
APR	19.000	19.000	23.000	18.000	21.000	19.000
JUN	18.000	17.000	.	.	18.000	16.000
AUG	16.000	16.000	18.000	18.000	16.000	16.000
OCT	18.000	16.000	17.000	16.000	16.000	16.000
DEC	16.000	15.000	16.000	13.000	16.000	15.000
BORON (UG/L)			DET'N LIMIT = 2.00	GUIDELINE = 5000 (A1)		
FEB	5.200 <T	6.200 <T	7.100 <T	7.200 <T	5.500 <T	6.800 <T
APR	16.000 <T	12.000 <T	12.000 <T	32.000	14.000 <T	12.000 <T
JUN	7.000 <T	5.900 <T	.	.	7.800 <T	5.600 <T
AUG	9.400 <T	9.100 <T	8.600 <T	8.500 <T	12.000 <T	8.400 <T
OCT	3.600 <T	3.500 <T	3.800 <T	3.600 <T	3.600 <T	2.900 <T
DEC	5.500 <T	6.100 <T	6.400 <T	6.000 <T	12.000 <T	6.300 <T
BERYLLIUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 6800 (D4)		
FEB	BDL	BDL	BDL	BDL	BDL	BDL
APR	.060 <T	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	.	.	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
CADMIUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 5 (A1)		
FEB	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	.	.	.090 <T	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	.080 <T	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
COBALT (UG/L)			DET'N LIMIT = 0.02	GUIDELINE = N/A		
FEB	.330 <T	.110 <T	.050 <T	.070 <T	.100 <T	.070 <T
APR	.220 <T	.140 <T	.060 <T	.040 <T	.060 <T	.110 <T
JUN	.130 <T	.100 <T	.	.	.090 <T	.110 <T
AUG	.080 <T	.030 <T	.040 <T	.060 <T	.080 <T	.070 <T
OCT	.360 <T	.120 <T	.090 <T	.170 <T	.100 <T	.080 <T
DEC	.220 <T	.140 <T	.120 <T	.140 <T	.160 <T	.110 <T
CHROMIUM (UG/L)			DET'N LIMIT = 0.50	GUIDELINE = 50 (A1)		
FEB	BDL	BDL	.580 <T	.700 <T	BDL	BDL
APR	1.200 <T	BDL	BDL	1.500 <T	BDL	BDL
JUN	.960 <T	.710 <T	.	.	.960 <T	.530 <T
AUG	.790 <T	.970 <T	.920 <T	.910 <T	1.000 <T	.850 <T
OCT	.600 <T	BDL	.630 <T	.630 <T	BDL	BDL
DEC	.590 <T	.800 <T	.730 <T	.570 <T	.770 <T	.530 <T
COPPER (UG/L)			DET'N LIMIT = 0.50	GUIDELINE = 1000 (A3)		
FEB	14.000	1.800 <T	74.000	5.200	31.000	2.900 <T
APR	14.000	1.000 <T	53.000	3.400 <T	21.000	3.000 <T
JUN	23.000	1.300 <T	.	.	16.000	3.400 <T
AUG	23.000	2.100 <T	18.000	3.300 <T	16.000	3.900 <T
OCT	15.000	1.400 <T	24.000	2.900 <T	17.000	3.400 <T
DEC	9.300	.940 <T	23.000	1.900 <T	25.000	2.400 <T
IRON (UG/L)			DET'N LIMIT = 6.00	GUIDELINE = 300 (A3)		
FEB	180.000	17.000 <T	48.000 <T	57.000 <T	7.900 <T	7.200 <T
APR	210.000	BDL	BDL	BDL	BDL	BDL
JUN	130.000	15.000 <T	.	.	14.000 <T	18.000 <T
AUG	76.000	25.000 <T	40.000 <T	44.000 <T	17.000 <T	9.600 <T
OCT	190.000	20.000 <T	38.000 <T	84.000	14.000 <T	13.000 <T
DEC	200.000	BDL	22.000 <T	21.000 <T	14.000 <T	11.000 <T
MERCURY (UG/L)			DET'N LIMIT = 0.02	GUIDELINE = 1 (A1)		
FEB	.030 <T	.030 <T	.	.	.	.
APR	BDL	BDL	.	.	.	.
JUN	!SS	!SS	.	.	.	.
AUG	BDL	BDL	.	.	.	.
OCT	BDL	BDL	.	.	.	.
DEC	.030 <T	BDL	.	.	.	.
MANGANESE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 50 (A3)		
FEB	11.000	8.100	8.300	11.000	8.200	8.100
APR	15.000	10.000	5.000	4.900	7.900	7.600
JUN	12.000	6.800	.	.	9.000	8.700
AUG	8.300	6.100	7.000	7.300	5.000	4.200
OCT	15.000	6.900	6.600	41.000	3.600	3.900
DEC	13.000	2.500	2.000	2.500	4.700	5.000

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
MOLYBDENUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = N/A		
FEB	.320 <T	.180 <T	.140 <T	.180 <T	.190 <T	.210 <T
APR	1.100	.190 <T	.130 <T	.250 <T	.180 <T	.140 <T
JUN	.180 <T	.110 <T	.	.	.080 <T	.090 <T
AUG	.210 <T	.180 <T	.180 <T	.230 <T	.170 <T	.110 <T
OCT	.210 <T	.210 <T	.180 <T	.210 <T	.190 <T	.160 <T
DEC	.220 <T	.150 <T	.170 <T	.160 <T	.170 <T	.190 <T
NICKEL (UG/L)			DET'N LIMIT = 0.20	GUIDELINE = 350 (D3)		
FEB	.540 <T	BDL	BDL	BDL	BDL	BDL
APR	.610 <T	BDL	BDL	BDL	BDL	BDL
JUN	.470 <T	BDL	.	.	BDL	BDL
AUG	.360 <T	BDL	.260 <T	BDL	.740 <T	.640 <T
OCT	1.000 <T	.960 <T	.890 <T	1.500 <T	.660 <T	.690 <T
DEC	.960 <T	.550 <T	.640 <T	.690 <T	.530 <T	.570 <T
LEAD (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 10. (A1)		
FEB	.310 <T	BDL	18.000	1.900	2.200	.130 <T
APR	.290 <T	BDL	9.600	.650	1.500	.110 <T
JUN	.330 <T	BDL	.	.	2.300	.270 <T
AUG	.210 <T	BDL	5.400	2.100	2.500	.450 <T
OCT	.330 <T	BDL	6.700	2.100	2.600	.360 <T
DEC	.280 <T	BDL	8.700	1.100	3.200	.250 <T
ANTIMONY (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 146 (D4)		
FEB	.780	.460 <T	.570	.570	.550	.380 <T
APR	.340 <T	.430 <T	.650	.580	.510	.580
JUN	.470 <T	.500 <T	.	.	.520	.480 <T
AUG	.420 <T	.380 <T	.550	.520	.530	.390 <T
OCT	.610	.380 <T	.500 <T	.470 <T	.570	.500 <T
DEC	.470 <T	.310 <T	.550	.530	.570	.500 <T
STRONTIUM (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = N/A		
FEB	44.000	53.000	62.000	57.000	58.000	56.000
APR	52.000	67.000	72.000	68.000	72.000	69.000
JUN	42.000	55.000	.	.	56.000	54.000
AUG	42.000	57.000	56.000	57.000	60.000	57.000
OCT	49.000	59.000	59.000	57.000	56.000	55.000
DEC	43.000	41.000	44.000	38.000	54.000	54.000
TITANIUM (UG/L)			DET'N LIMIT = 0.50	GUIDELINE = N/A		
FEB	9.100	6.800	4.800 <T	5.900	5.000 <T	4.600 <T
APR	12.000	9.200	9.400	8.600	9.300	9.300
JUN	11.000	9.700	.	.	9.900	11.000
AUG	6.300	7.300	7.200	7.600	7.600	7.400
OCT	9.600	4.700 <T	4.700 <T	6.000	4.100 <T	4.000 <T
DEC	8.200	4.500 <T	4.100 <T	3.900 <T	4.900 <T	5.100

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
URANIUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 100 (A1)		
FEB	.060 <T	BDL	BDL	BDL	BDL	BDL
APR	.130 <T	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	.	.	BDL	BDL
AUG	.070 <T	BDL	BDL	BDL	BDL	BDL
OCT	.060 <T	BDL	BDL	BDL	BDL	BDL
DEC	.070 <T	BDL	BDL	BDL	BDL	BDL
VANADIUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = N/A		
FEB	.460 <T	.950	.850	.910	1.100	1.100
APR	.570	.820	.930	.800	.950	.910
JUN	.420 <T	.960	.	.	.890	.980
AUG	.440 <T	1.300	.930	.930	1.400	1.500
OCT	.520	.840	.720	.790	.740	.640
DEC	.520	.700	.790	.750	.840	.750
ZINC (UG/L)			DET'N LIMIT = 0.20	GUIDELINE = 5000 (A3)		
FEB	4.900	3.700	7.400	4.500	14.000	3.100
APR	9.400	3.400	5.500	1.300 <T	7.600	3.100
JUN	3.500	3.100	.	.	12.000	3.700
AUG	2.200	2.800	7.200	3.600	8.000	2.600
OCT	3.800	3.100	6.800	6.100	7.500	3.400
DEC	3.100	2.900	4.600	2.700	10.000	2.700

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHLOROAROMATICS						
HEXACHLOROETHANE (NG/L)			DET'N LIMIT = 1.000	GUIDELINE = 1900 (D4)		
FEB	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	IIS
DEC	BDL	5.000 <T	.	5.000 <T	.	BDL
HEXACHLOROCYCLOPENTADIENE (NG/L)			DET'N LIMIT = 5.000	GUIDELINE = 206000 (D3)		
OCT	BDL	210.000	.	70.000	.	IIS
DEC	BDL	BDL	.	BDL	.	BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
PAH PHENANTHRENE (NG/L)			DET'N LIMIT = 10.	GUIDELINE = N/A		
FEB	BDL	BDL	.	.	.	.
APR	BDL	BDL	.	.	.	.
JUN	!IS	BDL	.	.	.	.
AUG	BDL	BDL	.	20.000 <T	.	BDL
OCT	BDL	BDL	.	.	.	.
DEC	BDL	BDL	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
PESTICIDES & PCB						
ALPHA BHC (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 700 (G)		
FEB	BDL	BDL	.	BDL	.	BDL
APR	BDL	1.000 <T	.	BDL	.	1.000 <T
JUN	BDL	BDL	.	.	.	BDL
AUG	BDL	2.000 <T	.	BDL	.	BDL
OCT	BDL	BDL	.	1.000 <T	.	IIS
DEC	BDL	BDL	.	BDL	.	BDL

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
PHENOLICS (UG/L PHENOLICS)			DET'N LIMIT = .200	GUIDELINE = 2 (A4)		
FEB	1.000	1.200	.	.	.	.
APR	.400 <T	BDL	.	.	.	.
JUN	BDL	BDL	.	.	.	.
AUG	.600 <T	.800 <T	.	.	.	.
OCT	.400 <T	.600 <T	.	.	.	.
DEC	.800 <T	1.000	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
VOLATILES						
BENZENE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 5 (A1)		
FEB	.050 <T	.150 <T	.	.100 <T	.	.050 <T
APR	BDL	BDL	.	.100 <T	.	BDL
JUN	BDL	.050 <T	.	.	.	.050 <T
AUG	BDL	BDL	.	.050 <T	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
ETHYLBENZENE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 2.4 (A3)		
FEB	.300 <T	.300 <T	.	.250 <T	.	.100 <T
APR	.100 <T	.050 <T	.	.300 <T	.	.100 <T
JUN	BDL	.150 <T	.	.	.	.050 <T
AUG	BDL	BDL	.	.050 <T	.	.100 <T
OCT	BDL	BDL	.	BDL	.	BDL
DEC	.100 <T	.150 <T	.	.100 <T	.	BDL
STYRENE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 100 (D1)		
FEB	.450 <T	.400 <T	.	.400 <T	.	.200 <T
APR	.100 <T	.100 <T	.	.450 <T	.	.200 <T
JUN	BDL	.350 <T	.	.	.	.100 <T
AUG	BDL	BDL	.	.100 <T	.	.200 <T
OCT	BDL	.100 <T	.	.100 <T	.	.100 <T
DEC	.150 <T	.250 <T	.	.150 <T	.	.050 <T
CHLOROFORM (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = 350 (A1+)		
FEB	.600 <T	36.100	.	31.500	.	41.200
APR	BDL	52.900	.	49.800	.	55.600
JUN	BDL	148.500	.	.	.	148.900
AUG	.100 <T	139.500	.	137.900	.	180.800
OCT	BDL	120.900	.	116.900	.	112.200
DEC	.100 <T	81.800	.	87.800	.	74.400
111, TRICHLOROETHANE (UG/L)			DET'N LIMIT = 0.02	GUIDELINE = 200 (D1)		
FEB	BDL	BDL	.	BDL	.	BDL
APR	.060 <T	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
DICHLOROBROMOMETHANE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 350 (A1+)		
FEB	BDL	1.350	.	.850	.	.900
APR	BDL	1.250	.	1.100	.	1.350
JUN	BDL	2.200	.	.	.	2.100
AUG	BDL	2.600	.	2.300	.	2.600
OCT	BDL	2.350	.	2.150	.	2.250
DEC	BDL	1.800	.	1.700	.	1.600

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM OTTAWA WSS (LEMIEUX ISLAND) 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
T-CHLOROETHYLENE (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 5 (D1)	
FEB	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	.050 <T
OCT	BDL	BDL	.	BDL	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
TOTL TRIHALOMETHANES (UG/L)			DET'N LIMIT = 0.50		GUIDELINE = 350 (A1)	
FEB	.600 <T	37.500	.	32.300	.	42.100
APR	BDL	54.150	.	50.900	.	56.950
JUN	BDL	150.700	.	.	.	160.000
AUG	BDL	142.050	.	140.150	.	183.450
OCT	BDL	123.200	.	119.100	.	114.450
DEC	BDL	83.600	.	89.550	.	75.950

TRACE LEVELS OF TOLUENE ARE LABORATORY ARTIFACTS DERIVED FROM THE ANALYTICAL METHODOLOGY.

TRACE LEVELS OF STYRENE ARE CONSIDERED TO BE LABORATORY ARTIFACTS RESULTING FROM THE LABORATORY SHIPPING CONTAINERS.

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
FECAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	0 (A1)
STANDARD PLATE COUNT MEMBRANE FILT.	CT/ML	0	500/ML (A3)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100ML (A1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	0	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	0	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	0	N/A
FIELD PH	DMNSLESS	N/A	6.5-8.5 (A3)
FIELD TEMPERATURE	DEG.C	N/A	15.0 (A3)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	0.2	30-500 (A3)
AMMONIUM TOTAL	MG/L	0.002	0.05 (F2)
CALCIUM	MG/L	0.2	100 (F2)
CHLORIDE	MG/L	0.2	250 (A3)
COLOUR	TCU	0.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.0	400 (F2)
CYANIDE	MG/L	0.001	0.2 (A1)
DISSOLVED ORGANIC CARBON	MG/L	0.1	5.0 (A3)
FLUORIDE	MG/L	0.01	2.4 (A1)
HARDNESS	MG/L	0.5	80-100 (A4)
LANGELIERS INDEX	DMNSLESS	N/A	N/A
MAGNESIUM	MG/L	0.1	30.0 (F2)
NITRITE	MG/L	0.001	1.0 (A1)
NITROGEN TOTAL KJELDAHL	MG/L	0.02	N/A
PH	DMNSLESS	N/A	6.5-8.5 (A4)
PHOSPHORUS FIL REACT	MG/L	0.0005	N/A
PHOSPHORUS TOTAL	MG/L	0.002	0.4 (F2)
SODIUM	MG/L	0.2	200 (A4)
SULPHATE	MG/L	0.2	500 (A3)
TOTAL NITRATES	MG/L	0.005	10.0 (A1)
TURBIDITY	FTU	0.05	1.0 (A1)
CHLOROAROMATICS			
123 TRICHLOROBENZENE	NG/L	5.0	N/A
1234 TETRACHLOROBENZENE	NG/L	1.0	N/A
1235 TETRACHLOROBENZENE	NG/L	1.0	N/A
124 TRICHLOROBENZENE	NG/L	5.0	10000 (I)
1245-TETRACHLOROBENZENE	NG/L	1.0	38000 (O4)
135 TRICHLOROBENZENE	NG/L	5.0	N/A
236 TRICHLOROTOLUENE	NG/L	5.0	N/A
245 TRICHLOROTOLUENE	NG/L	5.0	N/A
26A TRICHLOROTOLUENE	NG/L	5.0	N/A
HEXACHLOROBENZENE	NG/L	1.0	10 (C1)
HEXACHLOROBUTADIENE	NG/L	1.0	450 (D4)
HEXACHLOROCYCLOPENTADIENE	NG/L	5.0	206000 (D4)
HEXACHLOROETHANE	NG/L	1.0	1900 (D4)
OCTACHLOROSTYRENE	NG/L	1.0	N/A
PENTACHLOROBENZENE	NG/L	1.0	74000 (D4)
CHLOROPHENOLS			
234 TRICHLOROPHENOL	NG/L	100.0	N/A
2345 TETRACHLOROPHENOL	NG/L	20.0	N/A
2356 TETRACHLOROPHENOL	NG/L	10.0	N/A

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
245 TRICHLOROPHENOL	NG/L	100.0	2600000 (D4)
246 TRICHLOROPHENOL	NG/L	20.0	5000 (A1)
PENTACHLOROPHENOL	NG/L	10.0	60000 (A1)
METALS			
ALUMINUM	UG/L	0.10	100 (A4)
ANTIMONY	UG/L	0.05	146 (D4)
ARSENIC	UG/L	0.10	25 (A1)
BARIUM	UG/L	0.05	1000 (A2)
BERYLLIUM	UG/L	0.05	6800 (D4)
BORON	UG/L	2.00	5000 (A1)
CADMIUM	UG/L	0.05	5 (A1)
CHROMIUM	UG/L	0.50	50 (A1)
COBALT	UG/L	0.02	N/A
COPPER	UG/L	0.50	1000 (A3)
IRON	UG/L	6.00	300 (A3)
LEAD	UG/L	0.05	10 (A1)
MANGANESE	UG/L	0.05	50 (A3)
MERCURY	UG/L	0.02	1 (A1)
MOLYBDENUM	UG/L	0.05	N/A
NICKEL	UG/L	0.20	350 (D3)
SELENIUM	UG/L	1.00	10 (A1)
SILVER	UG/L	0.05	50 (A1)
STRONTIUM	UG/L	0.10	N/A
THALLIUM	UG/L	0.05	13 (D4)
TITANIUM	UG/L	0.50	N/A
URANIUM	UG/L	0.05	100 (A1)
VANADIUM	UG/L	0.05	N/A
ZINC	UG/L	0.20	5000 (A3)
PAH			
ANTHRACENE	NG/L	1.0	N/A
BENZO(A) ANTHRACENE	NG/L	20.0	N/A
BENZO(A) PYRENE	NG/L	5.0	10.0 (A1)
BENZO(B) CHRYSENE	NG/L	2.0	N/A
BENZO(B) FLUORANTHENE	NG/L	10.0	N/A
BENZO(E) PYRENE	NG/L	50.0	N/A
BENZO(G,H,I) PERYLENE	NG/L	20.0	N/A
BENZO(K) FLUORANTHENE	NG/L	1.0	N/A
CHRYSENE	NG/L	50.0	N/A
CORONENE	NG/L	10.0	N/A
DIBENZO(A,H) ANTHRACENE	NG/L	10.0	N/A
DIMETHYL BENZO(A) ANTHRACENE	NG/L	5.0	N/A
FLUORANTHENE	NG/L	20.0	42000.0 (D4)
INDENO(1,2,3-C,D) PYRENE	NG/L	20.0	N/A
PERYLENE	NG/L	10.0	N/A
PHENANTHRENE	NG/L	10.0	N/A
PYRENE	NG/L	20.0	N/A
PESTICIDES & PCB			
ALACHLOR (LASSO)	NG/L	500.0	5000 (A2)
ALDRIN	NG/L	1.0	700 (A1)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700 (G)
ALPHA CHLORDANE	NG/L	2.0	7000 (A1)
AMETRINE	NG/L	50.0	300000 (D3)
ATRATONE	NG/L	50.0	N/A
ATRAZINE	NG/L	50.0	60000 (A2)
DES ETHYL ATRAZINE	NG/L	200.0	60000 (A2)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300 (G)
CYANAZINE (BLADEX)	NG/L	100.0	10000 (A2)
O,P-DDD	NG/L	5.0	10 (I)
DIELDRIN	NG/L	2.0	700 (A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000 (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	5.0	74000 (D4)

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
ENDOSULFAN SULPHATE (THIODAN SULPHATE)	NG/L	5.0	N/A
ENDRIN	NG/L	5.0	1600 (D3)
GAMMA CHLORDANE	NG/L	2.0	7000 (A1)
HEPTACHLOR	NG/L	1.0	3000 (A1)
HEPTACHLOR EPOXIDE	NG/L	1.0	3000 (A1)
LINDANE (GAMMA BHC)	NG/L	1.0	4000 (A1)
METHOXYCHLOR	NG/L	5.0	900000 (A1)
METOLACHLOR	NG/L	500.0	50000 (A2)
METRIBUZIN (SENCOR)	NG/L	100.0	80000 (A1)
MIREX	NG/L	5.0	N/A
P,P-DDD	NG/L	5.0	N/A
O,P-DDT	NG/L	5.0	30000 (A1)
OXYCHLORDANE	NG/L	2.0	N/A
PCB	NG/L	20.0	3000 (A2)
PPDDE	NG/L	1.0	30000 (A1)
PPDDT	NG/L	5.0	30000 (A1)
PROMETONE	NG/L	50.0	52500 (D3)
PROMETRYNE	NG/L	50.0	1000 (A2)
PROPAZINE	NG/L	50.0	700000 (D3)
SIMAZINE	NG/L	50.0	10000 (A2)
D-ETHYL SIMAZINE	NG/L	200.0	10000 (A2)
TOXAPHENE	NG/L	500.0	5000 (A1)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	0.2	2 (A4)
SPECIFIC PESTICIDES			
2,4 D PROPIONIC ACID	NG/L	100.	N/A
2,4,5-TRICHLOROPHENOXY ACETIC ACID	NG/L	50.	280000 (A1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.	100000 (A1)
24-DICHLORORPHENOXYBUTYRIC ACID (24-DB)	NG/L	200.	18000 (B3)
BUTYLATE (SUTAN)	NG/L	2000.	245000 (D3)
CARBARYL (SEVIN)	NG/L	200.	90000 (A1)
CARBOFURAN	NG/L	2000.	90000 (A1)
CHLORPYRIFOS (DURSBAN)	NG/L	20.	N/A
CICP (CHLORPROPHAM)	NG/L	2000.	350000 (G)
DIALLATE	NG/L	2000.	N/A
DIAZINON	NG/L	20.	20000 (A1)
DICAMBA	NG/L	50.	120000 (A1)
DICHLOROVOS	NG/L	20.	N/A
EPTAM	NG/L	2000.	N/A
ETHION	NG/L	20.	35000 (G)
IPC	NG/L	2000.	N/A
MALATHION	NG/L	20.	190000 (A1)
METHYL PARATHION	NG/L	50.	7000 (B3)
METHYLTRITHION	NG/L	20.	N/A
MEVINPHOS	NG/L	20.	N/A
PARATHION	NG/L	20.	50000 (A1)
PHORATE (THIMET)	NG/L	20.	2000 (A2)
PROPOXUR (BAYGON)	NG/L	2000.	140000 (D3)
RELDAN	NG/L	20.	N/A
RONNEL	NG/L	20.	N/A
SILVEX (2,4,5-TP)	NG/L	20.	10000 (A1)
VOLATILES			
1,1 DICHLOROETHANE	UG/L	0.10	N/A
1,1 DICHLOROETHYLENE	UG/L	0.10	7 (D1)
1,2 DICHLOROBENZENE	UG/L	0.05	200 (A1)
1,2 DICHLOROETHANE	UG/L	0.05	5 (A1)

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
1,2 DICHLOROPROPANE	UG/L	0.05	5 (D1)
1,3 DICHLOROBENZENE	UG/L	0.10	3750 (D3)
1,4 DICHLOROBENZENE	UG/L	0.10	5 (A1)
111, TRICHLOROETHANE	UG/L	0.02	200 (D1)
112 TRICHLOROETHANE	UG/L	0.05	0.6 (D4)
1122 TETRACHLOROETHANE	UG/L	0.05	0.17(D4)
BENZENE	UG/L	0.05	5 (A1)
BROMOFORM	UG/L	0.20	350 (A1+)
CARBON TETRACHLORIDE	UG/L	0.20	5 (A1)
CHLOROBENZENE	UG/L	0.10	1510 (D3)
CHLORODIBROMOMETHANE	UG/L	0.10	350 (A1+)
CHLOROFORM	UG/L	0.10	350 (A1+)
DICHLOROBROMOMETHANE	UG/L	0.05	350 (A1+)
ETHLYENE DIBROMIDE	UG/L	0.05	50 (D1)
ETHYLBENZENE	UG/L	0.05	2.4 (A3)
M-XYLENE	UG/L	0.10	300 (A3*)
METHYLENE CHLORIDE	UG/L	0.50	50 (A1)
O-XYLENE	UG/L	0.05	300 (A3*)
P-XYLENE	UG/L	0.10	300 (A3*)
STYRENE	UG/L	0.05	100 (D1)
TETRACHLOROETHYLENE	UG/L	0.05	5 (D1)
TRANS 1,2 DICHLOROETHYLENE	UG/L	0.10	70 (D1)
TOLUENE	UG/L	0.05	24 (A3)
TOTAL TRIHALOMETHANES	UG/L	0.50	350 (A1)
TRICHLOROETHYLENE	UG/L	0.10	50 (A1)

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM
PROGRAM DESCRIPTION

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality;
- a flagging mechanism for guideline exceedance;
- a definition of contaminant levels and trends;
- a comprehensive background for remedial action;
- a framework for assessment of new contaminants; and
- an indication of treatment efficiency of plant processes.

PROGRAM

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario. In 1990, 76 systems were being monitored. Water supply locations have been prioritized for surveillance based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit.

A major goal of the program is to collect valid water quality data in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analyzed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling, in order to acquire complete plant process and distribution system details and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of raw (ambient water) and treated water at the treatment plant and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled. Sampling is carried out by operational personnel who have been trained in applicable procedures.

Comprehensive standardized procedures and field test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". Most laboratory analyses are carried out by the Ministry of Environment (MOE), Laboratory Services Branch. Radionuclides are analyzed by the Ministry of Labour.

DATA REPORTING MECHANISM

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP unit.

PROGRAM INPUTS AND OUTPUTS

There are four major inputs and four major outputs in the program.

Program Input - Plant and Distribution System Description

The system description includes plant specific non-analytical information acquired through a questionnaire and an initial plant visit. During the initial assessment of the plant and distribution system, questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The Plant and Distribution System Description consists of the following seven components:

1. PROCESS COMPONENT INVENTORY
All physical and chemical processes to which the water is subjected, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. TREATMENT CHEMICALS
Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. Chemical dosages applied on the day of sampling are recorded in DWSP.

3. PROCESS CONTROL MEASUREMENTS
Documentation of in-plant monitoring of process parameters (eg. turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. Except for the recorded Field Data, in-plant monitoring results are not retained in DWSP but are retained by the water treatment plant personnel.

4. DESIGN FLOW AND RETENTION TIME
Hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. Maximum, minimum and average flow, as well as a record of the flow rate on the day of sampling, are recorded in DWSP.

5. DISTRIBUTION SYSTEM DESCRIPTION
This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. SAMPLING SYSTEM
Each plant is assessed for its adequacy in terms of the sampling of bacteriological, organic and inorganic parameters. Prime considerations in the assessment and design of the sampling system are:

i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;

ii/ the water being sampled is not being modified by the sampling system;

iii/ the sample tap must be in a clean area of the plant, preferably a lab area; and

iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake,

discharge and tap); pump characteristics (model, type, capacity); and flow rate.

7. PERSONNEL
This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate MOE personnel associated with the plant.

Program Input - Field Data

The second major input to DWSP is field data. Field data is collected at the plant and from the distribution system sites on the day of sampling. Field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling, as well as, monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analyzed according to standardized DWSP protocols to allow for interplant comparison.

Program Input - Laboratory Analytical Data

The third major input to DWSP is Laboratory Analytical Data. Samples gathered from the raw, treated and distribution sampling sites are analyzed for the presence of approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. Parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments, parameters may be measured in a "scan" producing some results for parameters that are not on the DWSP priority list, but which may be of interest. The majority of parameters are measured on a routine basis. Those that are technically more difficult and/or costly to analyze, however, are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change, notation will be made and comparison data documented.

Program Input - Parameter Reference Information

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analyzed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database. An example is shown in figure 1.

Program output - Query

All DWSP information is easily accessed through the Query function, therefore, anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

Program Output - Action Alerts

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the Ontario Drinking Water Objectives publication. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective, an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of the confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedances at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, guidelines/limits from other agencies are used. The Parameter Listing System, published by MOE (ISBN 0-7729-4461-X), catalogues and keeps current guidelines for 650 parameters from agencies throughout the world. If these guidelines are exceeded, the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

Program Output - Report Generation

Custom reports can be generated from DWSP to meet MOE Regional needs and to respond to public requests.

Program Output - Annual Reports

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG.1

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

PARAMETER REFERENCE INFORMATION

BENZENE (B2001P) VOLATILES

CLASS: HEALTH METHOD: P0C0D0 UNIT: µg/L

SOURCE	FROM	TO	METHOD	GUIDELINE	UNIT	NOTE
CAL C	85/01			0.700	µg/L	AL
CDWG C	87/01			5.000	µg/L	MAC
EPA C	87/07			5.000	µg/L	MCL
EPAA C	80/11			6.600	µg/L	AMBIENT **
FERC C	84/05			1.000	µg/L	MCL
WHO C	84/01			10.000	µg/L	GV

DESCRIPTION:**NAME:** BENZENE

CAS#: 71-43-2

MOLECULAR FORMULAE: C_6H_6

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 µg/L

SYNONYMS: BENZOL; BENZOLE; COAL NAPHTHA; CARBON OIL (27). CYCLOHEXATRIENE (41).

CHARACTERISTICS: COLOURLESS TO LIGHT-YELLOW, MOBILE, NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE, AROMATIC ODOUR; VAPOURS BURN WITH SMOKING FLAME (30).

PROPERTIES: SOLUBILITY IN WATER: 1780-1800 mg/L AT 25C (41). THRESHOLD ODOUR: 0.5 - 10 PPM IN WATERTHRESHOLD TASTE: 0.5 mg/L IN WATER (39).
ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING ORGANISMS AND APPEARS TO ACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT A HIGH LIPID CONTENT OR REPRESENT MAJOR METABOLIC SITES, SUCH AS LIVER OR BRAIN; SMALL QUANTITIES EVAPORATE FROM SOILS OR ARE DEGRADED RATHER QUICKLY (80).

SOURCES: COMMERCIAL: PETROLEUM REFINING; SOLVENT RECOVERY; COAL TAR DISTILLATION (39); FOOD PROCESSING AND TANNING INDUSTRIES; COMBUSTION OF CAR EXHAUST.
ENVIRONMENTAL: POSSIBLE SOURCE IS RUNOFF.

USES: DETERGENTS; NYLON; INTERMEDIATE IN PRODUCTION OF OTHER COMPOUNDS, SUCH AS PESTICIDES; SOLVENT FOR EXTRACTION AND RECTIFICATION IN RUBBER INDUSTRY; DEGREASING AND CLEANSING AGENT; GASOLINE.

TOXICITY: RATING: 4 (VERY TOXIC).
ACUTE: IRRITATING TO MUCOUS MEMBRANES; SYMPTOMS INCLUDE RESTLESSNESS, CONVULSIONS, EXCITEMENT, DEPRESSION; DEATH MAY FOLLOW RESPIRATORY FAILURE.
CHRONIC: MAY CAUSE ANAEMIA AND LEUKAEMIA (45); MUTAGENIC.
MODE OF ACTION: CHROMOABERRATION IN LYMPHOCYTE CULTURES.

CARCINOGENICITY: A KNOWN HUMAN CARCINOGEN.

REMOVAL: THE FOLLOWING PROCESSES HAVE BEEN SUCCESSFUL IN REMOVING BENZENE FROM WASTEWATER: GAC ADSORPTION, PRECIPITATION WITH ALUM AND SUBSEQUENT REMOVAL VIA SEDIMENTATION, COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION, OXIDATION

ADDITIONAL PROPERTIES:
MOLECULAR WEIGHT: 78.12
MELTING POINT: 5.5°C (27).
BOILING POINT: 80.1°C (27).
SPECIFIC GRAVITY: 0.8790 AT 20°C (27).
VAPOUR PRESSURE: 100 MM AT 26.1°C (27).
HENRY'S LAW CONSTANT: 0.00555 ATM-M3/MOLE (41).
LOG OCT./WATER PARTITION COEFFICIENT: 1.95 TO 2.13 (39).
CARBON ADSORPTION: K=1.0; 1/N=1.6; R=0.97; PH=5.3 (41)SEDIMENT/WATER PARTITION COEFFICIENT: NO DATA

NOTES: EPA PRIORITY POLLUTANT.

Appendix B

DWSP SAMPLING GUIDELINE

i) Raw and Treated at Plant

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-220 mL plastic bottle with white seal on cap -do not rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (**Caution:** HNO_3 is corrosive)
Volatiles (duplicates) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do not rinse bottle -fill bottle completely without bubbles
Organics (OWOC),(OWTRI),(OAPAHX)	-1 L amber glass bottle per scan -do not rinse bottle -fill to 2 cm from top -when 'special pesticides' are requested three extra bottles must be filled

Cyanide	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops sodium hydroxide (NaOH) (**Caution:** NaOH is corrosive)
Mercury	-250 mL glass bottle -rinse bottle and cap three times -fill to top of label -add 20 drops each nitric acid (HNO_3) and potassium dichromate ($K_2Cr_2O_7$) (**Caution:** HNO_3&$K_2Cr_2O_7$ are corrosive)
Phenols	-250 mL glass bottle -do <u>not</u> rinse bottle, preservative has been added -fill to top of label
Radionuclides (as scheduled)	-4 L plastic jug -do <u>not</u> rinse, carrier added -fill to 5 cm from top
Organic Characterization (GC/MS - once per year)	-1 L amber glass bottle; instructions as per organic -250 mL glass bottle -do <u>not</u> rinse bottle -fill completely without bubbles

<u>Steps:</u>

1. Let sampling water tap run for an adequate time to clear the sample line.

2. Record time of day on submission sheet.

3. Record temperature on submission sheet.

4. Fill up all bottles as per instructions.

5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (**Caution:** HNO_3 is corrosive)

Steps:

1. Record time of day on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-250 mL plastic bottle with white seal on cap -do <u>not</u> rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked

Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid HNO_3 (**Caution:** HNO_3 is corrosive)
Volatiles (duplicate) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle, preservative has been added -fill bottle completely without bubbles
Organics (OWOC) (OAPAHX)	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top

<u>Steps:</u>

1. Record time of day on submission sheet.

2. Let cold water flow for five minutes.

3. Record temperature on submission sheet.

4. Fill all bottles as per instructions.

5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.